## INTERVIEW SUMMARY UNDER 37 CFR §1.133 AND MPEP §713.04

A telephonic interview in the above-referenced case was conducted on March 2, 2007 between the Examiner and Applicant Heon Jung. The Office Action mailed on December 20, 2006 was discussed. Specifically, the rejections of claims 1-14 were discussed and the distinctions between the cited references pointed out, as indicated in the remarks below.

The Applicants wish to thank the Examiner for the interview.

## REMARKS

Claim 1 has been amended to clarify the subject matter regarded as the invention. Claims 1-14 are pending.

The Examiner has rejected claims 1-14 under 35 USC 103(a) as being obvious in light of Hershkowitz et al. (U.S. Patent No. 5,883,138) in view of Anumakonda et al. (U.S. Patent No. 6,221,280), further in view of Zeng et al. (U.S. Patent No. 6,761,838), even further in view of Towler et al. (U.S. Patent No. 6,280,864).

The rejection is respectfully traversed. With respect to claim 1, The electrically heated catalyst (EHC) recited in claim 1 differs from the igniter of Towler et al. ('864) in that since the partial oxidation (POX) catalyst is coated on the EHC, the heat generated by electrically resistive heating of the EHC is rapidly transferred to the catalyst through *conductive* heat transfer. The result is fast heating of the POX catalyst and the fast startup of the POX reaction (less than 1.5 minute, in the example shown in Fig. 3).

By contrast, the igniter of Towler et al is in the form of two rods that are bridged by at least three cross bars. When electricity is supplied to the igniter, it becomes heated by electrically resistive heating and the heat is transferred *convectively* to the proximate POX catalyst. If the amount of transferred heat is sufficient to light-off the reaction, the reaction starts to proceed.

Since convective heat transfer is inherently slower than conductive heat transfer, the igniter of Towler et al is expected to initiate the POX reaction slower than the-catalyst-washcoated EHC recited in claim 1.

The catalyst described in Anumakonda et al. ('280) is a simple noble metal catalyst washcoated on a metal monolith which is different from the electrically heated catalyst of claim 1. Claim 1 recites welding electric wires welded onto the catalyst-washcoated metal monolith which serves as both the start-up device and the partial oxidation catalyst.

Preheating the reactant increases the conversion of hydrocarbon during the POX reaction. The reactor described in Hershkowitz et al. ('138) consumes electricity continuously to preheat

the reactant. However, the invention of claim 1 uses electricity only during the short start-up period and, once the POX reaction started, the electricity supply is terminated.

Instead of using electricity to preheat the reactant, claim 1 recites using a heat exchanger which increases the reactant temperature using hot product gas. In this way high conversion (higher than 94% methane conversion in Fig. 4) can be achieved without an external electricity supply. The heat exchanger set-up as recited in claim 1 also is different from the way Zeng et al. teach heating the reactant. Zeng et al. teach using a hot reacting ceramic reactor itself to heat the cold reactant.

None of the cited references teaches using for startup an electrically heated catalyst comprising a noble metal catalyst washcoated on a metal monolith or using hot product gases produced by the reactor to preheat the feed gas mixture. Therefore, claim 1 is believed to be allowable.

The examiner rejected claims 1-14 under 35 USC 112 as failing to describe an EHC comprising a metal monolith having welded electrical rods at both ends on the grounds that "wires" as recited in original claim 12 are not same as "rods" as recited in claim 1. However, both wires and rods would be understood by those of ordinary skill in the art to serve the same purpose of supplying electricity to the welded metal monolith. In any event, the rejection of claims 1-14 under 35 USC 112 is traversed on the grounds that an EHC comprising a metal monolith having welded electrical rods at both ends is described in the present application, without limitation, at page 10, lines 9-11.

Claims 2-14 depend from claim 1 and are believed to be allowable for the same reasons described above.

The foregoing amendments are not to be taken as an admission of unpatentability of any of the claims prior to the amendments.

Reconsideration of the application and allowance of all claims are respectfully requested based on the preceding remarks. If at any time the Examiner believes that an interview would be helpful, please contact the undersigned.

Respectfully submitted,

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